

1 I claim:

2 1. An apparatus for heating a segment of oil and gas
3 well bores and surrounding strata comprising:

4
5 an electrical resistance heating rod,

6
7 electrical cable for carrying electrical current from an
8 electrical current source outside of the well bore to
9 said electrical resistance heating rod when positioned
10 inside of said well bore;

11
12 a protective block in which is embedded said electrical
13 cable and said heating rod where they are connected to
14 one another, said protective block being constructed of
15 a moldable material which, when cured, is substantially
16 impervious to pressure and chemical permeation and oil
17 and gas well bore bottom pressures and environments;

18
19 a metallic encasement member encasing said protective
20 block and sealably welded to form a substantially
21 impervious enclosure with said block and said embedded
22 portion of said heating rod and said electrical cable

1 therein, except that said metallic encasement admits said
2 electrical cable and said heating rod there into for
3 attachment;

4
5 a perforated production tubing segment, a proximal
6 perforated production tubing segment end of which is
7 reversibly engageable to a distal terminus of oil or gas
8 well production tubing string and a distal perforated
9 production tubing segment end of which is engageable with
10 said metallic encasement member; and

11
12 a heating rod support frame which extends from said
13 metallic encasement means opposite its engagement with
14 said perforated production tubing segment and in which a
15 portion of said heating rod is supported.

16
17 2. The apparatus of claim 1 further comprising a first
18 and second connector pin, where said first pin joins said
19 electrical cable to said second pin and said second pin
20 joins said heating rod to said first pin.

1 3. The apparatus of claim 2 wherein said protective
2 block is further comprised of an insulated portion that
3 encloses the connection between said first pin and said
4 second pin.

5
6 4. The apparatus of claim 3 where said metallic
7 encasement member contains a reversibly sealable aperture
8 through which said moldable material may be repeatedly
9 injected to said block to ensure the absence of any void.

10
11 5. The apparatus of claim 4 where said metallic
12 encasement member is welded together using the "TEG"
13 welding process so as to impart extraordinary strength to
14 said metallic encasement member.

15
16 6. The apparatus of claim 1 wherein said protective
17 block is further comprised of an insulated portion that
18 encloses the connection between said first pin and said
19 second pin.

20
21 7. The apparatus of claim 6 where said metallic
22 encasement member contains a reversibly sealable aperture

1 through which said moldable material may be repeatedly
2 injected to said block to ensure the absence of any void.
3

4 8. The apparatus of claim 7 where said metallic
5 encasement member is welded together using the "TEG"
6 welding process so as to impart extraordinary strength to
7 said metallic encasement member.
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9 9. The apparatus of claim 1 where said metallic
10 encasement member contains a reversibly sealable aperture
11 through which said moldable material may be repeatedly
12 injected to said block to ensure the absence of any void.
13

14 10. The apparatus of claim 9 where said metallic
15 encasement member is welded together using the "TEG"
16 welding process so as to impart extraordinary strength to
17 said metallic encasement member.
18

19 11. The apparatus of claim 1 where said metallic
20 encasement member is welded together using the "TEG"
21 welding process so as to impart extraordinary strength to
22 said metallic encasement member.

1 12. A method for enhancing production from an oil and
2 gas well comprising the steps of:

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4 selecting an apparatus for heating a segment of oil and
5 gas well bores and surrounding said apparatus comprising:

6
7 an electrical resistance heating rod,

8
9 electrical cable for carrying electrical current from an
10 electrical current source outside of the well bore to
11 said electrical resistance heating rod when positioned
12 inside of said well bore;

13
14 a protective block in which is embedded said electrical
15 cable and said heating rod where they are connected to
16 one another, said protective block being comprised of a
17 moldable material which, when cured, is substantially
18 impervious to pressure and chemical permeation and oil
19 and gas well bore bottom pressures and environments;

20
21 a metallic encasement member encasing said protective
22 block and sealably welded to form a substantially

1 impervious enclosure with said block and said embedded
2 portion of said heating rod and said electrical cable
3 therein, except that said metallic encasement admits said
4 electrical cable and said heating rod there into for
5 attachment;

6
7 a perforated production tubing segment, a proximal
8 perforated production tubing segment end of which is
9 reversibly engageable to a distal terminus of oil or gas
10 well production tubing string and a distal perforated
11 production tubing segment end of which is engageable with
12 said metallic encasement member; and

13
14 a heating rod support frame which extends from said
15 metallic encasement means opposite its engagement with
16 said perforated production tubing segment and in which a
17 portion of said heating rod is supported;

18
19 positioning said heating rod adjacent to a production
20 zone in an oil or gas well bore, production from which
21 zone is believed to be impeded by viscous materials; and
22

1 attaching an electrical current source to said electrical
2 cable; and

3
4 actuating said electrical current source to heat said
5 heating rod and thereby heat said viscous materials in
6 said production zone for reducing viscosity of said
7 viscous materials for, in turn, producing said viscous
8 materials.

9
10 13. The method of Claim 12 wherein said positioning of
11 said heating rod adjacent to a production zone in an oil
12 or gas well bore involves positioning said heating rod at
13 a greater depth within said bore than said production
14 zone to thereby allow heat from said heating rod to rise
15 toward said production zone and said viscous materials
16 situated therein.